802.11g
PC Card/USB
Wireless Adapter

User Guide

Regulatory Approvals

FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

To assure continued compliance, any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. (Example - use only shielded interface cables when connecting to computer or peripheral devices).

FCC Radiation Exposure Statement

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) This device must accept any interference received, including interference that may cause undesired operation.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

Channel

The Wireless Channel sets the radio frequency used for communication.

- Access Points use a fixed Channel. You can select the Channel used. This allows you to choose a Channel which provides the least interference and best performance. In the USA and Canada, 11 channel are available. If using multiple Access Points, it is better if adjacent Access Points use different Channels to reduce interference.
- In "Infrastructure" mode, Wireless Stations normally scan all Channels, looking for an Access Point. If more than one Access Point can be used, the one with the strongest signal is used. (This can only happen within an ESS.)
- If using "Ad-hoc" mode (no Access Point), all Wireless stations should be set to use the same Channel. However, most Wireless stations will still scan all Channels to see if there is an existing "Ad-hoc" group they can join.

Table of Contents

CHAPTER 1 INTRODUCTION 1
- **Package Contents** 1
- **LEDs** 1
- **Operation** 2

CHAPTER 2 INITIAL INSTALLATION 3
- **Requirements** 3
- **Procedure** 3

CHAPTER 3 USING THE WINDOWS UTILITY 5
- **Overview** 5
- **System Tray Icon** 5
- **Site Survey Screen** 6
- **Add Profile Screen** 7
- **Profiles Screen** 10
- **Link Status Screen** 11
- **Statistics Screen** 11
- **Advanced Screen** 12
- **About Screen** 12

APPENDIX A SPECIFICATIONS 13
- **PC Card Adapter** 13
- **USB Adapter** 14
- **Wireless Interface** 15

APPENDIX B ABOUT WIRELESS LANS 17
- **Modes** 17
- **BSS/ESS** 17
- **Channels** 18
- **WEP** 18
- **Wireless LAN Configuration** 18

P/N:

Copyright © 2004. All Rights Reserved.

Document Version: 1.1 (August, 2004)

All trademarks and trade names are the properties of their respective owners.

Chapter 1
Introduction

This Chapter provides an overview of the Wireless Adapter's features and capabilities.

Congratulations on the purchase of your new Wireless Adapter. The Wireless Adapter provides a wireless network interface for your Notebook or PC.

Package Contents

The following items should be included:

- The Wireless Adapter Unit (PC Card or USB Adapter
- Power Adapter
- Quick Start Guide
- CD-ROM containing the on-line manual.

If any of the above items are damaged or missing, please contact your dealer immediately.

LEDs

PC Card Wireless Adapter

The PC Card Wireless Adapter has 2 LEDs - Ready and Link/Activity.

Ready LED	• On - Associated with an Access Point, or connected to an Ad-hoc wireless network. • Off - No wireless network available.
Link/Act LED	• On - Wireless ethernet connection established. • Off - No Wireless ethernet connection. • Flashing - Data being transferred.

USB Wireless Adapter

The PC Card Wireless Adapter has a single Link/Activity LED.

Link/Act LED	• On - Wireless ethernet connection established. • Off - No Wireless ethernet connection. • Flashing - Data being transferred.

Operation

You should install the supplied software on the CD-ROM before inserting the PC Card or USB adapter.

Chapter 2
Initial Installation

2

This Chapter covers the software installation of the Wireless Adapter.

Requirements

- Windows 98, ME, 2000, or XP.
- Available PC Card slot (for PC Card Wireless Adapter) or available USB port (for USB Wireless Adapter).
- CD-ROM drive.
- IEEE802.11b or IEEE802.11g wireless LAN.

Procedure

You should install the supplied software BEFORE inserting the PC Card or USB Adapter.

1. Insert the CD-ROM into the drive on your PC.
2. The installation program should start automatically. If it does not, run the SETUP.EXE program.

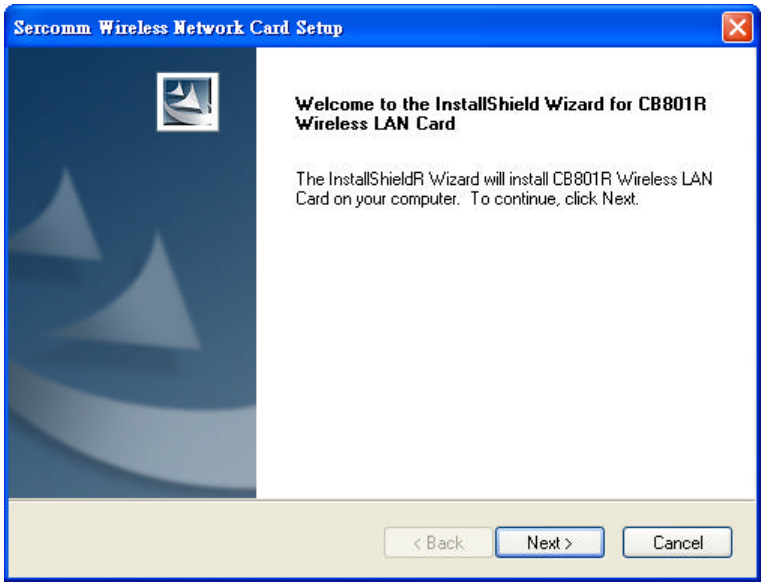

Figure 1: Start Installation

3. On the screen above, click "Next" to start the installation.
4. Step though the procedure until you see the screen below.

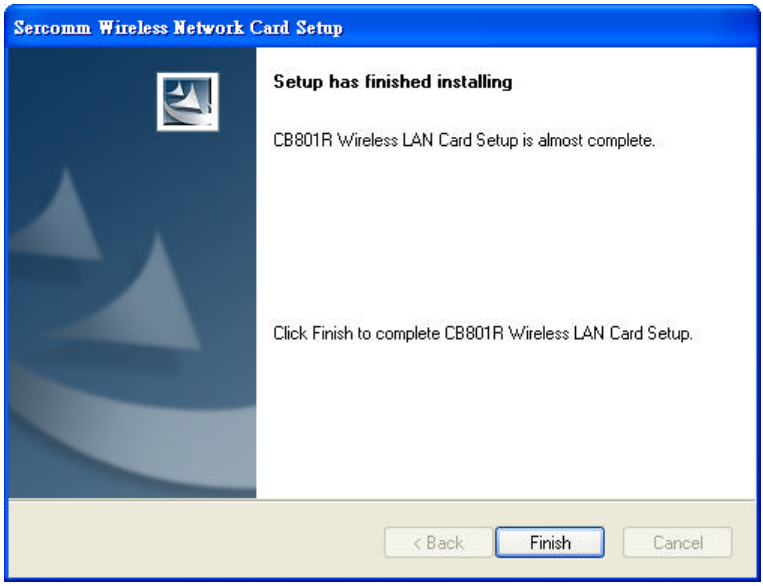

Figure 2: Installation completed

5. Click "Finish" to close the installation program.
6. Insert the PC Card or USB Adapter into your PC.
7. The Windows "New Hardware" wizard will then start.
   - Allow it to complete the installation of the Windows driver.
   - If using Windows XP, you may see a warning screen like the example below. If you do see this screen, just click "Continue Anyway"

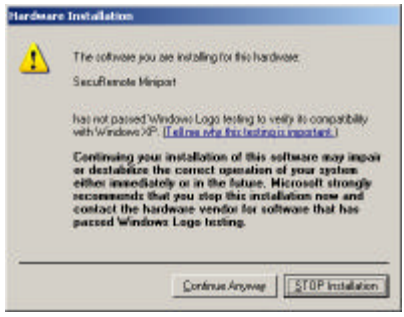

Figure 3: Windows XP Warning

8. When the Windows wizard is complete, you will now have a new icon in your system tray, as shown below.
9. You will now have a new icon in your system tray, as shown below.

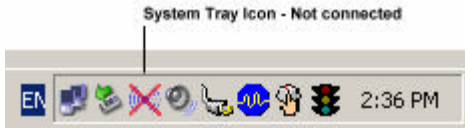

Figure 4: System Tray Icon

10. You can double- click this icon to configure the Wireless interface. See the following chapter for details..

Chapter 3
Using the Windows Utility

3

This Chapter provides Setup details for the AP mode of the Wireless Adapter.

Overview

If using Windows XP, you have the option of using Windows itself to configure the Wireless interface, or using the supplied utility.

To Use Windows XP for Configuration

- Right-click the System Tray icon
- From the pop-up menu, select "Use Zero Configuration as Configuration utility".

To Use the supplied Windows utility for Configuration

- Right-click the System Tray icon
- From the pop-up menu, select "Use ScConfig as Configuration utility".

The Chapter assumes you are using the supplied ScConfig utility.

System Tray Icon

If the ScConfig program is running, it will display an Icon in the System Tray. You can double-click the

If the program is not running, you can start it using the option in the Start menu created by the installation.

For the PC Card, this will be *Start - Programs - Sphairon - CB801R - ScConfig2500*.

For the USB Adapter, this will be *Start - Programs - Sphairon - USB801R - ScConfig2500*.

Status Information

The System Tray icon indicates the status of the Wireless adapter, as shown below.

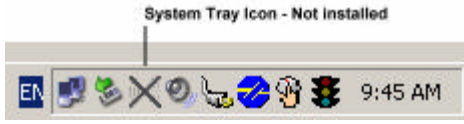

Figure 5: Wireless Adapter not Installed

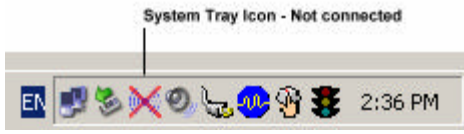

Figure 6: Not Connected

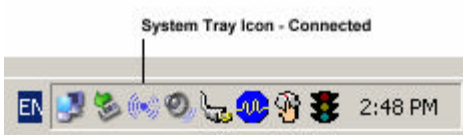

Figure 7: Connected

Connecting to a Wireless Network

Double-click the Icon to open the Site Survey screen, when you can select the Wireless network you wish to join.

Site Survey Screen

This screen is displayed when you double-click the system tray icon.

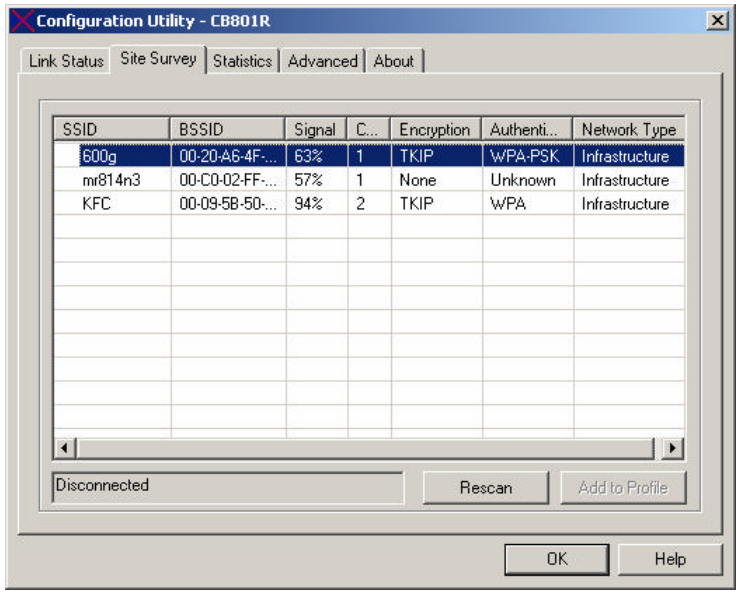

Figure 8: Site Survey Screen

Information - Site Survey Screen

SSID	Available wireless networks are listed.
BSSID	This is the MAC address of the Access Point (or Wireless station, if the network is an Ad-hoc network).
8ignal Strength	This is displayed as percentage (0 ~ 100%).
Channel No.	The channel used by the Wireless network.
Encryption	This indicates the encryption method used on the Wireless LAN.
Authentication	This indicates the authentication method used on the Wireless LAN.
Network Type	This will indicate "Infrastructure" (displayed device is an Access Point) or "Ad-hoc" (displayed device is a Wireless station.)
Status	The area to the left of the "Rescan" button show the current status. In the example above, it shows "Disconnected".

Rescan	Click this button to rescan for all Wireless networks.
Add to Profile	Click this to complete configuration of the selected Wireless Network. See below for details.

To Connect to a Wireless Network

1. Double-click on the desired network.
2. You will then see the ***Add Profile*** screen.
   See below for details on using this screen.

Note that once you are connected to a Wireless network, the Site Survey screen will identify the current wireless network with a green "handshake" icon, as shown below.

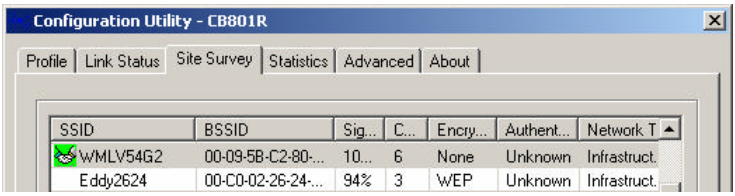

Figure 9: Site Survey Screen - Connected

Add Profile Screen

This screen is accessed by clicking the *Wireless Security* button on the ***AP Setup*** screen.

It has 2 tabs - *Configuration* and *Authentication and Security*.

Configuration Tab

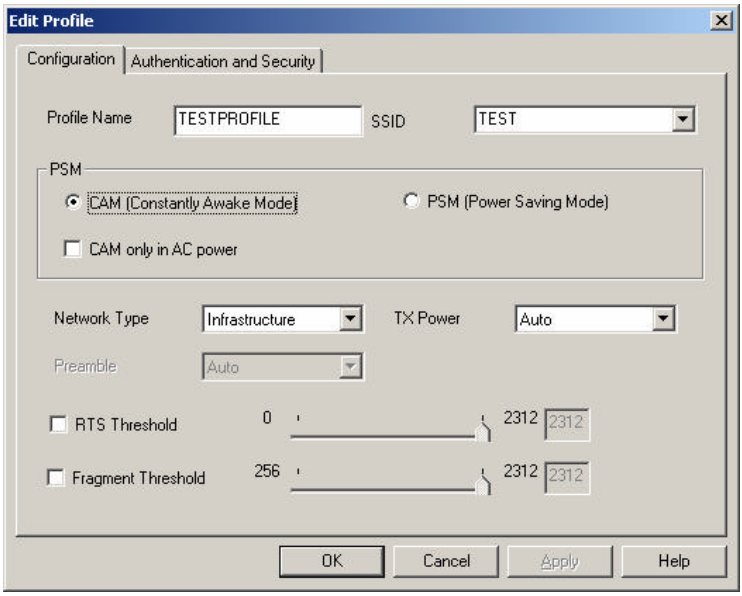

Figure 10 Settings Tab

Profile Name	Enter a suitable name for this profile. Each profile must have a unique name.

SSID	If the desired wireless network is currently available, you can select its SSID. Otherwise, type in the SSID of the desired wireless network.
PSM	Select the desired power saving options.
Network Type	Select the desired option: • **Infrastructure** - Select this to connect to an Access point. • **Ad Hoc** - Select this to if there is no Access point, PCs connect directly to each other.
RTS Threshold	This setting is provided for technical support staff.
Fragment Threshold	This setting is provided for technical support staff.

Authentication and Security Tab

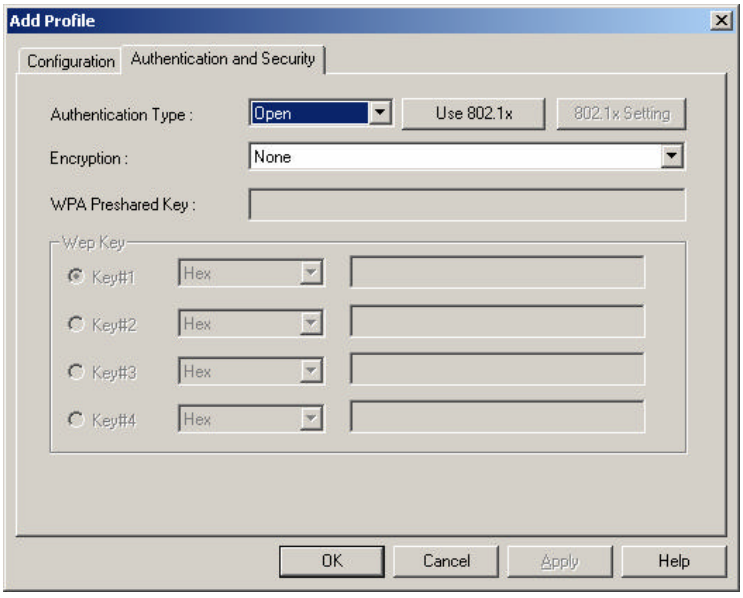

Figure 11: Authentication and Security Tab

Data - Authentication and Security Tab

Authentication Type	You MUST select the option to match the Wireless LAN you wish to join. The available options are: • Open - Broadcast signals are not encrypted. This method can be used only with no encryption or with WEP. • Shared - Broadcast signals are encrypted using WEP. This method can only be used with WEP. • WPA - This method uses a key which is automatically generated. • WPA-PSK - PSK means "Pre-shared Key". You must enter this key value; it is used for both authentication and encryption.
Encryption	The available options depend on the Authentication method

	selected above. The possible options are: • WEP - If selected, you must enter the WEP data shown below. This WEP data must match the Access Point or other Wireless stations. • AES, TKIP - These options are available with WPA and WPA-PSK. Select the correct option.
WPA Preshared Key	This is for WPA-PSK only. If using WPA-PSK Enter the PSK (Pre-shared Key), sometimes called the network key. All Wireless stations must use the same key.
WEP Key	This section is grayed out unless using WEP. • **Key #** - You can enter up to 4 keys. Use the radio button to select the Default key (used for transmissions.) You must enter the default key; the other keys are optional. • **Hex/ASCII** - Select the method of entering the key value. (Note: Hex chars are 0~9 and A~F.) • Enter the key value or values you wish to use. These must match the Access Point or other wireless stations. The **Default Key** is required, the others are optional.

Profiles Screen

Once you have created a profile, as described above, the Profiles tab will be available on the main screen.

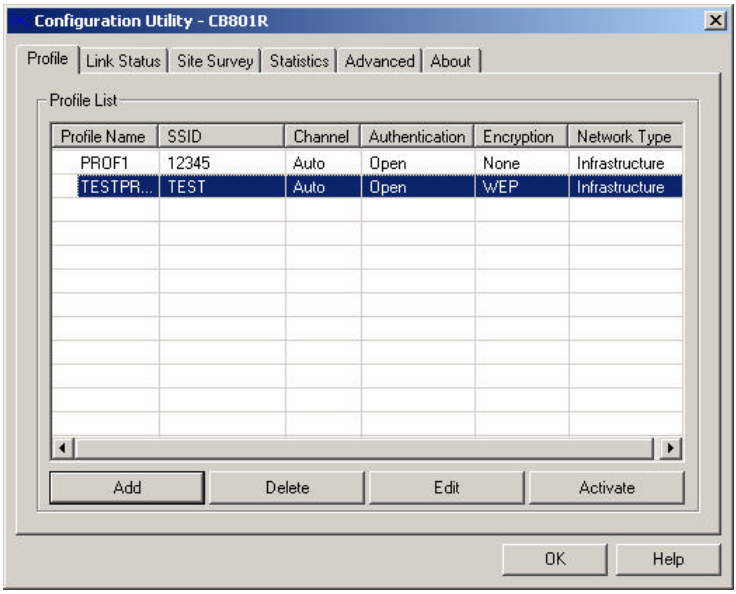

Figure 12: Profiles Screen

Data - Profiles Screen

Profile Name	The name of the Profile. Each profile must have a unique name.
SSID	The SSID for this profile.
Channel No.	The channel used by the Wireless network associated with this profile.
Authentication	This indicates the authentication method used on the Wireless network associated with this profile.
Encryption	This indicates the encryption method network used on the Wireless network associated with this profile.
Network Type	This will indicate "Infrastructure" or "Ad-hoc".
Buttons	
Add	Add a new profile
Delete	Delete the selected Profile.
Edit	Change the selected Profile.
Activate	Connect to the Wireless network specified by the selected profile.

Link Status Screen

This screen displays the quality of the current wireless link.

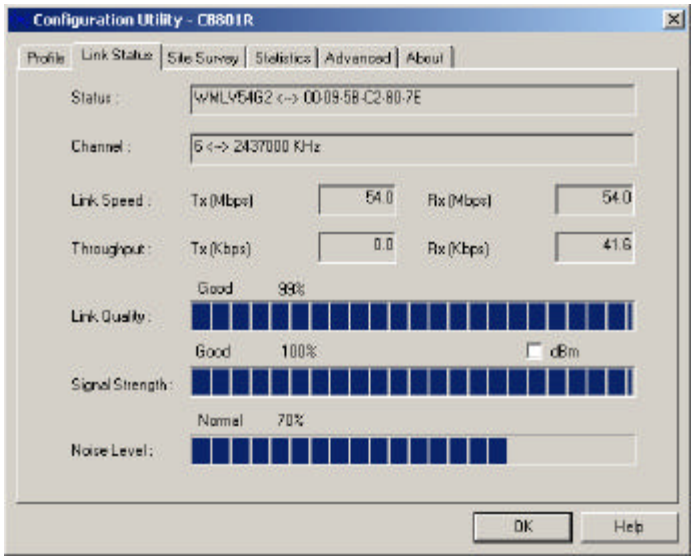

Figure 13: Link Status Screen

You may have to wait a few seconds for the screen to be populated.

Statistics Screen

This screen displays details of the traffic sent or received on the current Wireless network.

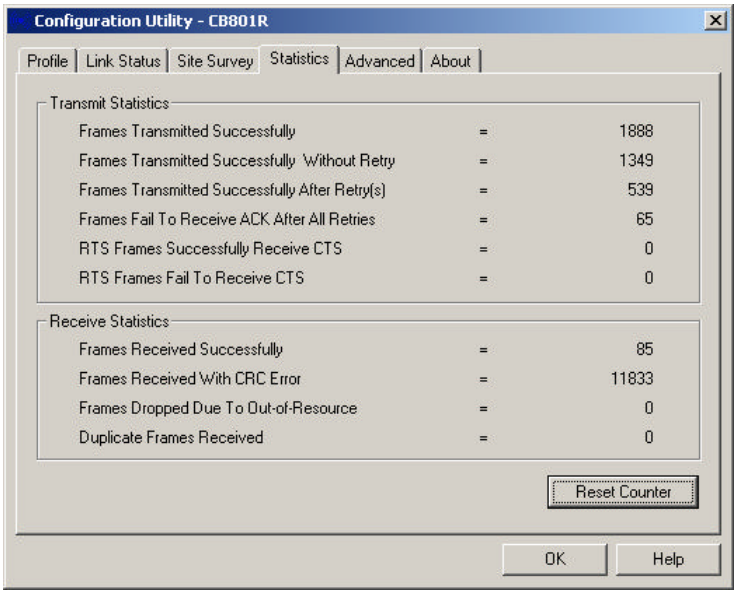

Figure 14: Statistics Screen

Advanced Screen

This screen is for use by technical support staff and advanced users only. See the "Help" for details of the settings on this screen..

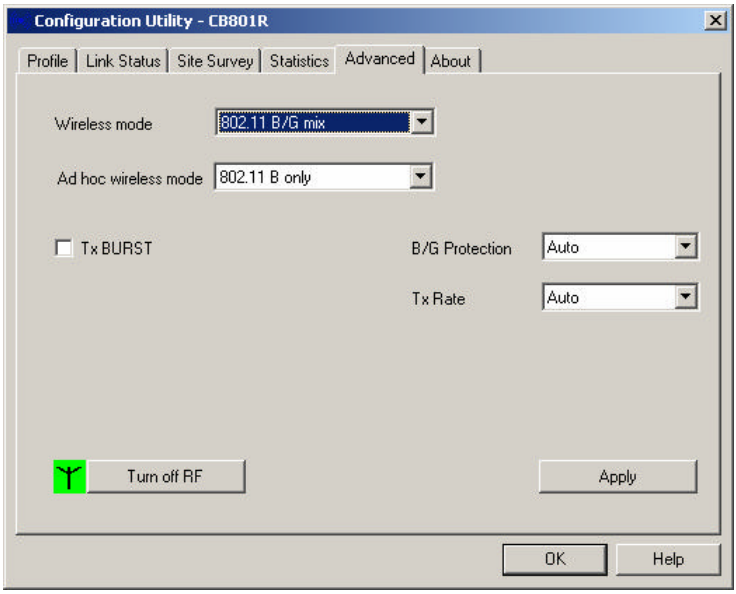

Figure 15: Advanced Screen

About Screen

This screen displays details of the traffic sent or received on the current Wireless network.

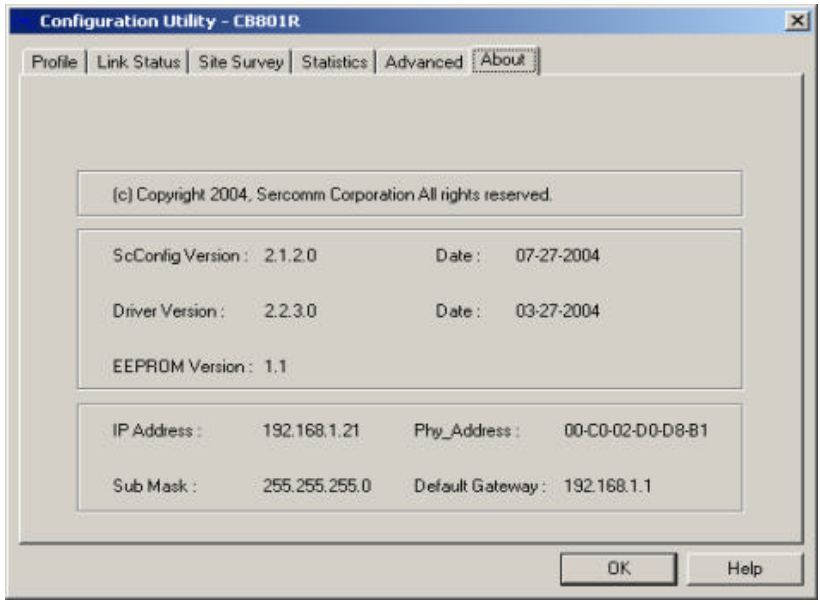

Figure 16: Screen

Appendix A
Specifications

This Appendix covers the most likely problems and their solutions.

PC Card Adapter

Model	CB801R
Chipset:	Ralink RT2560
RF Chip:	Ralink RT2525
Bus Type:	CardBus
Data Rates :	54, 48, 36, 24, 18, 12, 9, and 6 Mbps (802.11g)
	11, 5.5, 2, 1 Mbps (802.11b)
Frequency Band :	2.4GHz to 2.462GHz
Wireless Medium :	DSSS and OFDM
Media Access Protocol:	CSMA/CA
Operating Channels:	1-14(FCC:1-11、ETSI:1-13、Japan:1-14)
Operating Range:	• Indoors: Up to 328 ft (100 meters) • Outdoors: Up to 1312 ft (400 meters)
Receive Sensitivity :	
802.11g	54 Mbps: -70 dBm
	48 Mbps: -72 dBm
	36 Mbps: -77 dBm
	24 Mbps: -80 dBm
	18 Mbps: -82 dBm
	12 Mbps: -85 dBm
	9 Mbps: -86 dBm
	6 Mbps: -88 dBm
802.11b	11 Mbps: -86 dBm
	5.5 Mbps: -89 dBm
	2 Mbps: -91 dBm
	1 Mbps: -91 dBm
Wireless Medium:	DSSS (Direct Sequence Spread Spectrum)
Media Access Protocol:	CSMA/CA
Transmit Power:	
802.11g:	17.5 ± 2 dBm

802.11b:	18.5 ± 2 dBm
Security :	64/128-bit WEP WPA—Wi-Fi Protected Access
Standards Conformance:	WPA certified, IEEE 802.11g, IEEE 802.11b
EMI:	FCC, CE
Environmental Range:	
Operating temperature:	0° to 40°C (32° to 104°F)
Operating humidity:	0 to 90% non-condensing
System Requirements	Notebook PC must be running Windows 98SE/ME/XP/ 2000

USB Adapter

Model	UB801R
Chipset:	Ralink RT2572
RF Chip:	Ralink RT2526
Bus Type:	USB 2.0
Data Rates :	54, 48, 36, 24, 18, 12, 9, and 6 Mbps (802.11g)
	11, 5.5, 2, 1 Mbps (802.11b)
Frequency Band :	2.4GHz to 2.462GHz
Wireless Medium :	DSSS and OFDM
Media Access Protocol:	CSMA/CA
Operating Channels:	1-14(FCC:1-11、ETSI:1-13、Japan:1-14)
Operating Range:	• Indoors: Up to 328 ft (100 meters) • Outdoors: Up to 1312 ft (400 meters)
Receive Sensitivity :	
802.11g	54 Mbps: -71 dBm
	48 Mbps: -73 dBm
	36 Mbps: -77 dBm
	24 Mbps: -81 dBm
	18 Mbps: -83 dBm
	12 Mbps: -83 dBm
	9 Mbps: -83 dBm
	6 Mbps: -83 dBm
802.11b	11 Mbps: -87 dBm
	5.5 Mbps: -88 dBm

	2 Mbps: -89 dBm
	1 Mbps: -89 dBm
Wireless Medium:	DSSS (Direct Sequence Spread Spectrum)
Media Access Protocol:	CSMA/CA
Transmit Power:	
802.11g:	13.5 dBm
802.11b:	17.5 dBm
Security :	64/128-bit WEP WPA—Wi-Fi Protected Access
Standards Conformance:	WPA certified, IEEE 802.11g, IEEE 802.11b
EMI:	FCC, CE
Environmental Range:	
Operating temperature:	0° to 40°C (32° to 104°F)
Operating humidity:	0 to 90% non-condensing
System Requirements	Notebook or desktop PC with USB port; USB 2.0 required for 54 Mbps data rate
	Notebook or desktop PC must be running Windows 98SE/ME/XP/ 2000

Model	Wireless Adapter
Dimensions	70 mm (W) * 105 mm(D) * 22 mm (H)
Operating Temperature	0° C to 40° C
Storage Temperature	-10° C to 70° C
Network Protocol:	TCP/IP
Network Interface:	1 * 10/100BaseT Ethernet 1 * Wireless Interface
LEDs	3
Power Adapter	5 V DC External

Wireless Interface

Standards	IEEE802.11g WLAN, JEIDA 4.2, roaming support
Frequency	2.4 to 2.4835GHz (Industrial Scientific Medical Band)
Channels	Maximum 14 Channels, depending on regulatory authorities

Modulation	DSSS BPSK/QPSK/CCK, OFDM/CCK
Data Rate	Up to 54 Mbps
Coverage Area	Indoors : 10m @54Mbps, 80m @6Mbps or lower Outdoors : 30m @54Mbps, 200m @6Mbps or lower
Security	WEP 64Bit, WEP 128Bit, WPA-PSK
Output Power	13 dBm (typical)
Receiver Sensitivity	-80 dBm Min.

Appendix B
About Wireless LANs

This Appendix provides some background information about using Wireless LANs (WLANs).

Modes

Wireless LANs can work in either of two (2) modes:

- Ad-hoc
- Infrastructure

Ad-hoc Mode

Ad-hoc mode does not require an Access Point or a wired (Ethernet) LAN. Wireless Stations (e.g. notebook PCs with wireless cards) communicate directly with each other.

Infrastructure Mode

In Infrastructure Mode, one or more Access Points are used to connect Wireless Stations (e.g. Notebook PCs with wireless cards) to a wired (Ethernet) LAN. The Wireless Stations can then access all LAN resources.

Note!

Access Points can only function in "Infrastructure" mode, and can communicate only with Wireless Stations which are set to "Infrastructure" mode.

BSS/ESS

BSS

A group of Wireless Stations and a single Access Point, all using the same ID (SSID), form a Basic Service Set (BSS).

Using the same SSID is essential. Devices with different SSIDs are unable to communicate with each other.

ESS

A group of Wireless Stations, and multiple Access Points, all using the same ID (ESSID), form an Extended Service Set (ESS).

Different Access Points within an ESS can use different Channels. In fact, to reduce interference, it is recommended that adjacent Access Points SHOULD use different channels.

As Wireless Stations are physically moved through the area covered by an ESS, they will automatically change to the Access Point which has the least interference or best performance. This capability is called **Roaming**. (Access Points do not have or require Roaming capabilities.)

Channels

The Wireless Channel sets the radio frequency used for communication.

- Access Points use a fixed Channel. You can select the Channel used. This allows you to choose a Channel which provides the least interference and best performance. In the USA and Canada, 11 channel are available. If using multiple Access Points, it is better if adjacent Access Points use different Channels to reduce interference.
- In "Infrastructure" mode, Wireless Stations normally scan all Channels, looking for an Access Point. If more than one Access Point can be used, the one with the strongest signal is used. (This can only happen within an ESS.)
- If using "Ad-hoc" mode (no Access Point), all Wireless stations should be set to use the same Channel. However, most Wireless stations will still scan all Channels to see if there is an existing "Ad-hoc" group they can join.

WEP

WEP (Wired Equivalent Privacy) is a standard for encrypting data before it is transmitted.

This is desirable because it is impossible to prevent snoopers from receiving any data which is transmitted by your Wireless Stations. But if the data is encrypted, then it is meaningless unless the receiver can decrypt it.

If WEP is used, the Wireless Stations and the Access Point must have the same settings for each of the following:

WEP	Off, 64 Bit, 128 Bit
Key	For 64 Bit encryption, the Key value must match. For 128 Bit encryption, the Key value must match
WEP Authentication	Open System or Shared Key.

Wireless LAN Configuration

To allow Wireless Stations to use the Access Point, the Wireless Stations and the Access Point must use the same settings, as follows:

Mode	On client Wireless Stations, the mode must be set to "Infrastructure". (The Access Point is always in "Infrastructure" mode.)
SSID (ESSID)	Wireless Stations should use the same SSID (ESSID) as the Access Point they wish to connect to. Alternatively, the SSID can be set to "any" or null (blank) to allow connection to any Access Point.
WEP	The Wireless Stations and the Access Point must use the same settings for WEP (Off, 64 Bit, 128 Bit). **WEP Key:** If WEP is enabled, the Key must be the same on the Wireless Stations and the Access Point. **WEP Authentication:** If WEP is enabled, all Wireless Stations must use the same setting as the Access Point (either "Open System" or "Shared Key").